

Hemoglobin A1c Test

The hemoglobin (HbA1c) test measures the average amount of sugar (*glucose*) in your blood during the 2–3 months just before the test (rather than measuring the current amount of glucose in the sample of blood). Some of the glucose that circulates in your blood binds to blood proteins. Hemoglobin (Hb) is a blood protein that carries oxygen in the red blood cells (RBCs). When glucose binds to Hb, the glucose-coated Hb is called glycated Hb. Once Hb is glycated, it remains that way for the life of the RBC (about 120 days).

The HbA1c test is used to diagnose diabetes mellitus and to monitor long-term control of blood sugar in people who have diabetes mellitus. The HbA1c test can be used in place of or in combination with fasting blood glucose level and oral glucose tolerance tests.

There are several methods for measuring the concentration of HbA1c in the blood. One method uses antibodies that bind specifically to HbA1c. A lab instrument then measures the concentration of bound antibodies in a sample. A second method called ion exchange high-pressure liquid chromatography separates HbA1c from other types of Hb on the basis of differences in electrical charge. A third method for measuring HbA1c uses enzymes that react specifically with the glucose on HbA1c to produce a measurable color change.

RESULTS

It is your responsibility to obtain your test results. Ask the lab or department performing the test when and how you will get your results. Contact your health care provider to discuss any questions you have about your results.

Range of Normal Values

Ranges for normal values may vary among different labs and hospitals. You should always check with your health care provider after having lab work or other tests done to discuss the meaning of your test results and whether your values are considered within normal limits. The range for normal HbA1c test results is from 4.5% to less than 5.7%.

Meaning of Results Outside Normal Value Ranges

Abnormally high HbA1c values are most commonly an indication of prediabetes mellitus and diabetes mellitus:

- An HbA1c result of 5.7–6.4% is considered diagnostic of prediabetes mellitus.
- An HbA1c result of 6.5% or higher on two separate occasions is considered diagnostic of diabetes mellitus.

There are certain conditions that can cause a falsely low HbA1c test result. These conditions include pregnancy, blood loss, blood transfusions, anemia caused by premature destruction of red blood cells (*hemolytic anemia*), and certain unusual forms of Hb (*Hb variants*), such as sickle cell trait.

There are certain conditions that can cause a falsely low HbA1c test result. These conditions include iron deficiency, kidney failure, and certain Hb variants.